Repetisjon veke 37

Uavhengigheit

$X_1, X_2, \ldots, X_n$ er uavhengige dersom $f\left(x_1, \ldots, x_n\right) = \prod_{i=1}^{n} f\left(x_i\right)$.

Forventing

$$E\left[X\right] = \begin{cases} \sum_{x} xf\left(x\right), \; X \text{ diskret} \\ \int_{-\infty}^{\infty} xf\left(x\right)dx, \; X \text{ kont} \end{cases}$$

$$E\left[g(X)\right] = \begin{cases} \sum_{x} g(x)\, f\left(x\right), \; X \text{ diskret} \\ \int_{-\infty}^{\infty} g(x)\, f\left(x\right)dx, \; X \text{ kont} \end{cases}$$

$$E\left[g(X,Y)\right] = \begin{cases} \sum_{y} \sum_{x} g(x,y)\, f\left(x,y\right), \; (X,Y) \text{ diskret} \\ \int_{-\infty}^{\infty} \int_{\infty}^{\infty} g(x,y)\, f\left(x,y\right)dxdy, \; (X,Y) \text{ kont} \end{cases}$$

$$E\left[\sum_{i=1}^{n} a_i X_i\right] = \sum_{i=1}^{n} a_i E\left[X_i\right]$$

$$E\left[X \mid Y = y\right] = \begin{cases} \sum_{x} xf\left(x \mid y\right), \; X \text{ diskret} \\ \int_{-\infty}^{\infty} xf\left(x \mid y\right)dx, \; X \text{ kont} \end{cases}$$

Varians

$$Var\left[X\right]=E\left[\left(X-\mu_x\right)^2\right]=\begin{cases}\sum_x\left(x-\mu_x\right)^2 f\left(x\right), X \text{ diskret}\\ \int_{-\infty}^{\infty}\left(x-\mu_x\right)^2 f\left(x\right)dx, X \text{ kont}\end{cases}$$

Standardavvik

$$\sigma=\sqrt{Var\left[X\right]}$$

Kovarians

$$\sigma_{XY}=Cov\left(X,Y\right)=E\left[\left(X-\mu_x\right)\left(Y-\mu_Y\right)\right]=E\left[g\left(X,Y\right)\right]$$

$$\sigma_{XY}=E\left[XY\right]-E\left[X\right]E\left[Y\right]$$

$$X,Y\ uavh\ \Rightarrow \sigma_{XY}=0$$

Korrelasjonskoeffisienten

$$\rho_{X,Y}=\frac{\sigma_{XY}}{\sigma_x\sigma_Y},\ \text{-}1\leq\rho_{X,Y}\leq 1$$

Reknereglar for varians

$$Var\left[aX+b\right]=a^2Var\left[x\right]$$

$$Var\left[aX+bY\right]=a^2\sigma_X^2+2ab\sigma_{XY}+b^2\sigma_Y^2$$